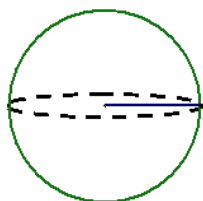
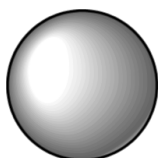


Spheres

Sphere-The set of all points that are a given distance (radius) to a given point (center).



$$A = 4\pi r^2$$

Ex:

$$r = 4\text{cm}$$

$$V = \frac{4}{3} \pi r^3$$

$$A = 4\pi 4^2$$

$$A = 64\pi \text{ cm}^2$$

Ex:

$$V = \frac{32000\pi}{3} \text{ cm}^3$$

$$A = \frac{16000\pi}{3} \text{ cm}^2$$

$$4\pi 20^2$$

$$3 \times \sqrt{8000}$$

$$\frac{32000\pi}{3} = \frac{4}{3}\pi r^3$$

$$32,000 = 4r^3$$

$$8,000 = r^3$$

$$20\text{cm} = r$$

Ex:

$$A = 12\pi \text{ cm}^2$$

$$A = 4\pi r^2$$

$$12\pi = 4\pi r^2$$

$$3 = r^2$$

$$\sqrt{3} = r$$

$$V = \frac{4\pi\sqrt{3}}{3} \text{ cm}^3$$

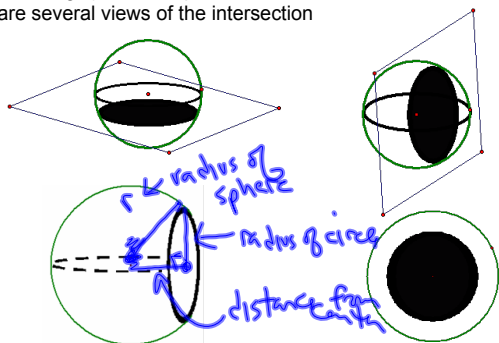
$$\frac{4}{3}\pi (\sqrt{3})^3$$

$$\frac{4}{3}\pi 3\sqrt{3}$$

$$\sqrt{3} \cdot \sqrt{3} \cdot \sqrt{3}$$

$$3 \cdot \sqrt{3}$$

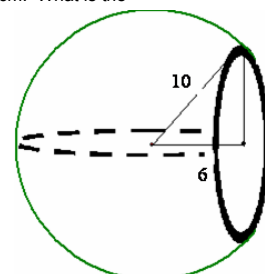
When a sphere and a plane intersect, the intersection is a circle. Try to imagine slicing an orange what two dimensional shape is left where you cut the slice-a circle. Also, imagine pouring water into sphere (but not filling it) what shape is the surface of the water-a circle. Shown are several views of the intersection



EX:

A plane intersects a sphere 6 cm from the center of the sphere. The radius of the sphere is 10 cm. What is the area of the circle formed?

Radius of the circle = 8 cm
(Pythagorean thm.)
Area of the circle = $64\pi \text{ cm}^2$



EX:

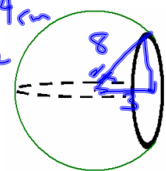
A plane intersects a sphere 3 cm from the center of the sphere. The radius of the sphere is 8 cm. What is the area of the circle formed?

Radius of the circle = $\sqrt{55} \approx 7.4 \text{ cm}$
(Pythagorean thm.)

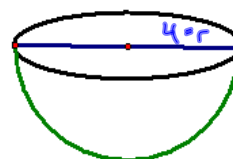
Area of the circle = $55\pi \text{ cm}^2$

$$\begin{aligned} r^2 + 3^2 &= 8^2 \\ r^2 + 9 &= 64 \\ r^2 &= 55 \end{aligned}$$

$$A = \pi r^2$$



The great circle occurs when the slice is taken at the hemisphere.



What is the TA of the hemisphere, if the area of the great circle is 16π ?

$$TA = \frac{1}{2} 4\pi r^2 + \pi r^2$$

$$\begin{aligned} TA &= 3\pi r^2 \\ \text{Hemisphere} \quad 3 \cdot 16\pi &= \boxed{48\pi} \end{aligned}$$

HW

p674-675 10-14, 17, 18,21,24

p 704 9, 10, 13-15